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ABSTRACT

Private industry is by far the largest single employer of scientists and engineers in the U.S. economy, using about two-thirds of all persons employed as scientists and engineers. For the first time in five years, data on the employment of scientists, engineers, and technicians in industry are available. Reported are employment trends, employment by occupation and major industry groups, employment in energy-related activities, and reliability of data. Among the items reported are the following: (1) employment of scientists and engineers in private industry decreased 5% between 1970 and 1975, compared to a 14% gain between 1965-70 and a 19% gain from 1960-65; (2) engineers comprised 72% of the total scientists and engineers employed by private industry; and (3) employment of scientists and engineers engaged in R&D activity declined some 12% from 1970-75. (Author/RH)

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Private Industry Employment of Scientists and Engineers in 1975 Shows 5-Year Decline

Introduction

Private industry is by far the largest single employer of scientists and engineers in the U.S. economy, using around two-thirds of all persons employed as scientists and engineers.

For the first time in 5 years, data on the employment of scientists, engineers, and technicians in industry are available now from a nationwide survey of employers. These data were collected for the National Science Foundation by the Bureau of the Census. Major results of the current survey show that in 1975:

- Engineers (850,000) made up 72 percent of the total scientists and engineers employed by private industry.
- Among the engineering specialties, the largest numbers employed were electrical engineers (292,000) and mechanical/aeronautical engineers (201,000).
- Computer scientists comprised the largest group of scientists (143,000). This scientific specialty also represented the largest group employed in the nonmanufacturing industries (100,000).
- Among physical scientists (104,000), the most numerous specialty was chemists (65,000), of whom more than three-quarters were employed in nondurable goods manufacturing industries, including the chemical industries.

Employment Trends

Although data collected in this survey are not strictly comparable with data previously collected by the Bureau of Labor Statistics, adjustments have been made to gain comparability, and time series data from 1960 are shown in table 1.

- Employment of scientists and engineers in private industry decreased 5 percent between 1970 and 1975, compared to a 14-percent gain in the period 1965-70 and a 19-percent gain from 1960 to 1965.
- Manufacturing industries showed an employment decline of 13 percent in the latest 5-year period, compared to an 11-percent gain from 1965 to 1970.

Table 1.—Total employment of scientists and engineers by major industrial sector: 1960 through 1970, and 1975

(In thousands)

Year	Total	Manufacturing			Nonmanufacturing
		Total	Durable goods	Nondurable goods	
1960	799	543	406	137	256
1961	829	569	429	141	260
1962	863	594	449	145	269
1963	909	628	479	149	281
1964	929	644	479	155	286
1965	949	647	490	157	302
1966	984	670	506	164	314
1967	1,022	701	534	167	321
1968	1,046	715	547	168	331
1969	1,075	719	549	171	355
1970	1,085	718	542	177	367
1975	1,031	622	459	163	409

NOTE: Detail may not add to totals because of rounding.

SOURCES: Data for 1960 through 1970 from Bureau of Labor Statistics; data for 1975 from Bureau of the Census, as adjusted by the National Science Foundation.

- Nonmanufacturing industries had an employment increase of 11 percent from 1970 to 1975, compared to a 21-percent gain in the previous 5 years.
- The number of engineers employed in private industry dropped by 5 percent from 1970 to 1975, reversing the 14-percent upward trend shown from 1965 to 1970 (table 2). The major part of this drop occurred in durable goods manufacturing; nonmanufacturing industries showed an 11-percent increase in engineering employment.
- The number of scientists employed also dropped by 5 percent from 1970 to 1975; this decrease was also concentrated in durable goods manufacturing.
- Employment of scientists and engineers engaged in R&D activity declined some 12 percent from 1970 to 1975 (table 3). Once again, the largest portion of this decline was felt in the durable goods manufacturing industries.

(Prepared in the Manpower Utilization Studies Group, Division of Science Resources Studies.)

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Table 2.—Employment of scientists and engineers by major industrial sector: selected years

[In thousands]

Major industrial sector	Scientists				Engineers			
	1960	1965	1970	1975	1960	1965	1970	1975
Total	137	160	187	178	663	789	898	853
Manufacturing	102	116	132	115	441	531	587	507
Durable goods	38	41	48	37	365	449	494	422
Nondurable goods	64	75	84	78	76	82	93	85
Nonmanufacturing	35	44	55	63	222	258	312	346

SOURCES: Data for 1960, 1965, and 1970 from Bureau of Labor Statistics; data for 1975 from Bureau of the Census, as adjusted by the National Science Foundation.

Table 3.—Employment of scientists and engineers in R&D activities by major industrial sector: 1960 through 1970, and 1975

[In thousands]

Year	Total	Manufacturing			Nonmanufacturing
		Total	Durable goods	Nondurable goods	
1960	282	238	187	51	45
1961	297	251	199	52	46
1962	319	270	215	56	49
1963	343	290	232	58	53
1964	351	297	236	60	54
1965	360	301	238	62	59
1966	370	307	243	64	63
1967	384	318	253	64	67
1968	387	318	254	63	69
1969	388	317	253	64	71
1970	372	298	232	66	74
1975	329	232	172	60	97

NOTE: Detail may not add to totals because of rounding.

SOURCES: Data for 1960 through 1970 from Bureau of Labor Statistics; data for 1975 from Bureau of the Census, as adjusted by the National Science Foundation.

Employment by Occupation and Major Industry Group, 1975

Almost one-half of all engineers were reported employed in durable goods manufacturing industries in 1975 (table 4). The electrical machinery and transportation equipment industries account, in turn, for over one-half of this total.

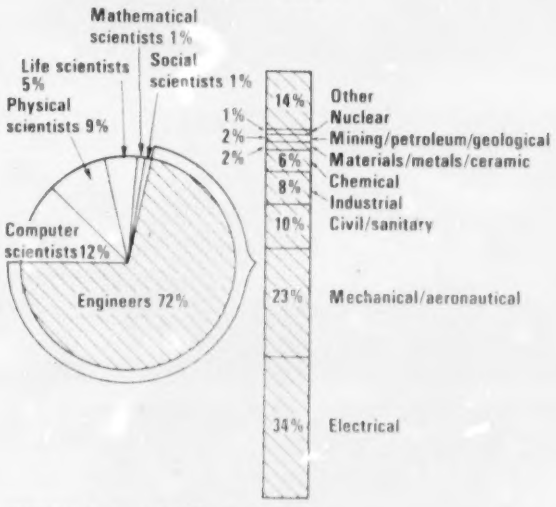
Among all scientists and engineers employed in private industry, the largest group of scientists is the computer scientists, accounting for 12 percent of employment (chart 1). Physical scientists (9 percent) and life scientists (5 percent) are the next most numerous groups.

Employment in Energy-Related Activities

By occupation. Approximately 18 percent of all engineers, and 10 percent of scientists, are employed in energy-related activities (chart 2). Over 60 percent of the scientists and engineers involved in energy-related activities are either electrical engineers, mechanical/aeronautical engineers, or physical scientists. The engineering specialty most highly concentrated in energy-related activities is nuclear engineering, with some 70 percent of the persons employed in that occupation engaged in such pursuits. Over 60 percent of mining/petroleum/geological engineers also perform such tasks. Among scientists, the physical sciences group is most heavily concentrated in energy activities, a ratio greatly affected by the large proportion of geologists so engaged (table 5).

CHART 1. Scientists and engineers employed in private industry by occupation: 1975

Total: 1,183,500



SOURCE: National Science Foundation

Table 4.—Employment of scientists and engineers by occupation and major industrial sector: 1975

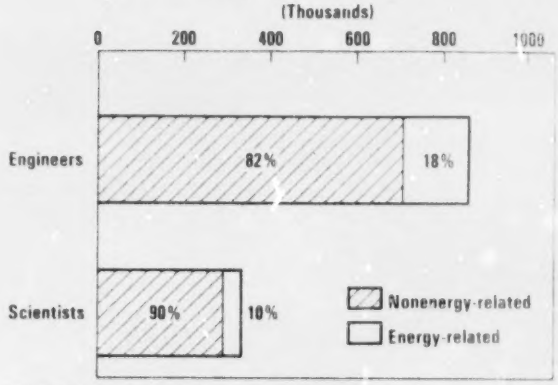
[In thousands]

Occupation	Total	Manufacturing			Nonmanufacturing
		Total	Durable goods	Nondurable goods	
Total, scientists and engineers	1,184	670	491	179	514
Physical scientists	104	85	29	55	19
Chemists	15	59	9	50	6
Physicists	11	10	9	1	1
Other physical scientists	28	16	11	4	12
Metallurgists	9	9	9	(1)	(1)
Geologists	14	3	1	2	11
Other	5	4	2	2	1
Life scientists	60	24	3	20	36
Mathematical scientists	14	7	4	2	7
Computer scientists	143	43	29	14	100
Social scientists (incl. psychologists)	10	5	2	3	5
Engineers	853	507	422	85	346
Chemical	50	41	11	30	9
Civil/sanitary	82	11	8	3	71
Electrical	292	143	137	6	149
Industrial	67	57	45	12	9
Materials/metals/ceramic	20	16	15	1	4
Mechanical/aeronautical	201	157	137	21	44
Mining/petroleum/geological	18	3	2	1	15
Nuclear	7	4	4	(1)	2
Other	117	74	64	11	43

(1) Less than 500 employees.

SOURCE: Bureau of the Census, as adjusted by the National Science Foundation.

CHART 2. Scientists and engineers employed in private industry in energy-related and nonenergy-related activities: 1975



SOURCE: Bureau of the Census, as adjusted by National Science Foundation

By energy source. Over one-third of all scientists and engineers involved in energy-related activities were engaged in some aspect of electrical power work, while over 30 percent were involved with petroleum energy (chart 3). Natural gas and nuclear fuel energy accounted for most of the remainder of the employment.

Table 5.—Scientists and engineers employed in energy-related activities by occupation and major industrial sector: 1975

Occupation	(In thousands)					As percent of total scientists and engineers				
	Total	Manufacturing			Nonmanufacturing	Total	Manufacturing			Nonmanufacturing
		Total	Durable goods	Nondurable goods			Total	Durable goods	Nondurable goods	
Total scientists and engineers	186	91	60	31	95	15.7	13.6	12.2	17.5	18.4
Physical scientists	24	12	2	10	12	22.9	14.3	7.5	17.9	60.6
Chemists	8	6	1	6	1	11.8	10.7	6.5	11.5	21.0
Physicists	2	1	(1)	1	1	17.1	14.0	4.6	71.4	45.5
Other physical scientists	14	4	1	3	10	51.1	28.0	10.5	74.4	81.0
Metallurgists	1	1	(1)	(1)	(1)	10.9	10.0	4.7	(2)	(2)
Geologists	12	3	1	2	9	87.9	96.8	(2)	100.0	85.5
Other	1	1	(1)	(1)	(1)	17.8	13.9	5.0	25.0	(2)
Life scientists	1	1	(1)	1	1	2.2	2.1	(1)	2.5	2.2
Mathematical scientists	1	1	(1)	1	1	9.9	11.9	4.5	21.8	8.1
Computer scientists	6	4	2	2	2	4.3	9.1	7.5	12.4	2.1
Social scientists	1	1	(1)	1	1	13.7	12.2	4.5	18.5	15.1
Engineers	152	74	55	18	78	17.8	14.5	13.1	21.4	22.6
Chemical	13	9	2	7	4	26.8	22.2	21.8	22.3	48.8
Civil/sanitary	12	2	1	1	10	14.8	20.8	17.5	30.8	13.9
Electrical	40	11	10	1	28	13.6	8.0	7.3	23.3	19.0
Industrial	5	4	*	1	1	7.8	7.1	3.0	4.1	9.6
Materials/metals/ceramic	3	2	2	(1)	1	16.7	13.0	12.2	23.1	30.2
Mechanical/aeronautical	48	33	28	6	15	24.0	21.0	20.2	26.8	34.8
Mining/petroleum/geological	11	2	1	1	9	62.1	74.2	61.1	92.3	59.6
Nuclear	5	4	3	(1)	1	70.1	79.5	78.6	(2)	57.2
Other	14	6	4	1	8	11.6	7.5	6.6	13.2	16.9

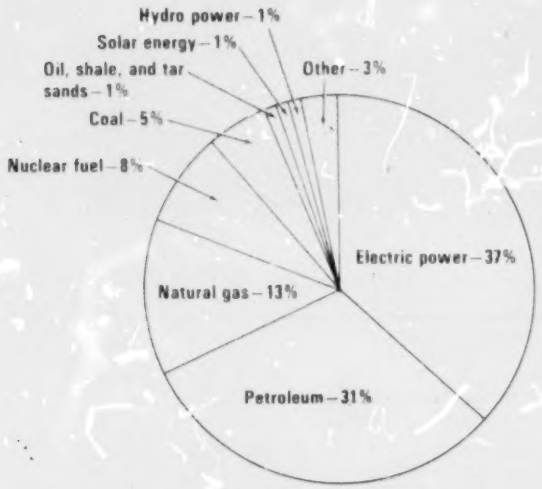
(1) Less than 500 employed.

(2) Base less than 1.0 thousand employees, considered too small to derive meaningful ratio.

NOTE: Detail may not add to totals because of rounding.

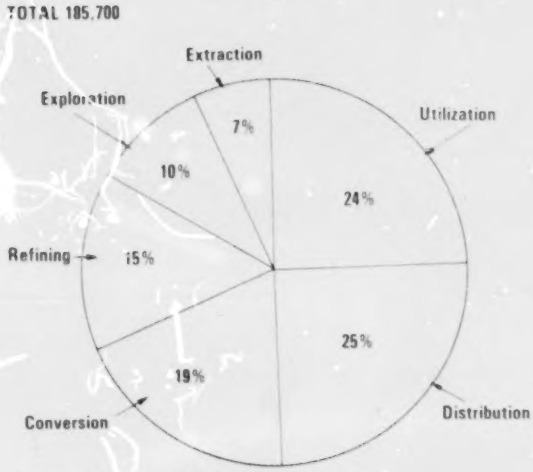
SOURCE: Bureau of the Census, as adjusted by the National Science Foundation.

CHART 3. Employment of scientists and engineers in private industry in energy-related activities by energy source: 1975


Hydro power – 1%
Solar energy – 1%
Oil, shale, and tar sands – 1%
Other – 3%
Coal – 5%
Nuclear fuel – 8%
Electric power – 37%
Natural gas – 13%
Petroleum – 31%

SOURCE: Bureau of the Census, as adjusted by the National Science Foundation

CHART 4. Employment of scientists and engineers in private industry by type of energy-related activity: 1975



SOURCE: Bureau of the Census, as adjusted by the National Science Foundation

By type of activity. About one-quarter of scientists and engineers engaged in energy-related activities are employed in the transportation, transmission, distribution, and storage of the various energy sources, with a slightly smaller number engaged in the utilization aspects of energy, including such activities as conservation, improved efficiency, and improved environmental conditions in energy end-use (chart 4).

Reliability of Data

The statistics in these tables are estimates derived from a sample survey. There are two types of errors possible in a sample survey—sampling and nonsampling. Sampling errors—occurring because observations are made only on a sample, not on the entire population—are in the 1-percent to 9-percent range for various occupational employment totals and manufacturing subtotals. Exceptions are computer and social scientists—23 percent and 33 percent, respectively. In the nonmanufacturing industries, standard sampling errors generally lie within a 5-percent to 35-percent range. A more detailed presentation of these statistics will appear in the final report to be published shortly.

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